ZAKŁAD ZOOLOGII SYSTEMATYCZNEJ
POLSKIEJ AKADEMII NAUK

ACTA ZOOLOGICA
CRACOVIENSIA

Tom XII Kraków, 30. XI. 1967 Nr 14

Mihály ENDES, Lajos HORVÁTH & Béla HÜTTLER

The Life History of the Hungarian Short-toed Lark *Calandrella cinerea hungarica* HORVÁTH, 1956, in Hortobágy, Hungary

[Pp. 379—391, pls. XXIV—XXVI and 1 text-fig.]

Życie węgierskiego skowrończyka *Calandrella cinerea hungarica* HORVÁTH, 1956, w Hortobágy na Węgrzech

Жизнь венгерского малого жаворонка *Calandrella cinerea hungarica* HORVÁTH, 1956, в Хортобадь, в Венгрии

Abstract. The authors deal with the phenology, ways of living, biology of the breeding season, nest-building and nesting success of *Calandrella cinerea hungarica* HORVÁTH, which is the northernmost form of the Short-toed Lark. Certain elements of its biology are compared with the corresponding elements of other avian species, especially those of larks.

I. INTRODUCTION

The Hungarian Short-toed Lark *Calandrella cinerea hungarica* HORVÁTH, 1956 forms the northernmost isolated population of the Short-toed Larks. The characters of this subspecies have evolved as an adaptation to the alkali flats which it inhabits. Whereas the nominative form and all the other known subspecies are yellowish, Isabella or rufous in colour according to their environment, the Hungarian subspecies is light mouse grey, in which it resembles the colour of its habitat — dry, dusty, greyish alkali fields. However conspicuous this colour is, distinguishable not only when compared in whole series but also in single specimens, it is not the sole distinctive feature of this subspecies; its measurements are also different, namely, the wing and the tail are significantly shorter and the bill considerably longer than in other known forms. These

distinctive characteristics account for the classification of this isolated Hungarian population as a new subspecies. Its description was based on 17 specimens collected near the village Nagyiván in Hortobágy on May 5, 1955.

The nesting of the new subspecies in north-eastern Hungary is a sporadic and not obtrusive phenomenon, the more so, since it is limited to some out-of-the-way localities of the large alkali flats. These circumstances induced us to take up intense studies on the biology of this interesting and remote subspecies. Naturally, we were quite sure beforehand that the life history of this race could not exhibits any habit entirely at variance with those of the other subspecies. However, the biology of the other races except for the nominative form is hardly known and this fact was another inducement to us to present as complete a picture of the life history of the Hungarian Short-toed Lark as possible.

It must be added here that the breeding habits of the Short-toed Lark were investigated by SZABÓ (1965) and its migrations and occurrence by VÖNÖCZKY-SCHENK (1907), NAGY (1934, 1940), UDVARDY (1941, 1960), KEVE (1955, 1958) and STERBETZ (1959).

Our observations extended over the years 1955, 1959 and 1962—1965, six years all together. In the first two years short and occasional observations were made during the collection of material. On the contrary, the next four years, except for intervals when we were busy collecting specimens, were given to extensive observations. These observations, varying in duration, were made in different seasons of the year, according to the phase of life history which was to be investigated.

II. SPRING ARRIVAL

The birds arrive in the first days of April. They settle together in a selected place, in which they next nest. Observations indicate that Hungarian Short-toed Larks form single nesting groups when still on migration, because, though no definite nesting in colonies has been found, groups of up to 20 pairs arrive in places which have been occupied for years. At that time there are no outsiders in the group and the stock remains the same even during the second breeding of the year. Such occupation of an area, closely resembling nesting colonies, is rather surprising in Hortobágy, since this plain, about 100 km long and 50 km wide, has innumerable sites which are very suitable for settling, and yet the birds inhabit only 4—5 sites, relatively small as compared with the whole area.

III. SETTLING AND SINGING

The sites chosen for nesting are characterized by highly degraded alkali soil. Grassy flats covered with the wormwood and fescue community *(Artemisiae-festucetum)* alternating with the natron community *(Camphorosmaetum)* and pools, varying in size, scattered about, at least so at the time of spring

arrivals, are elements of the scenery of these sites. At first the arriving specimens move about in flocks of 4—5 birds all over the future nesting area. Soon, however, they form pairs and the area is divided into nesting territories, which activity is completed, according to our observations, in 10—14 days after arrival.

The birds frequently utter their calling notes, which resemble those of the Crested Lark, the House and Tree Sparrows or the Wagtail, but they also begin singing soon after their arrival. The length of their song in the selected territory is very various, which is due to a number of factors. For example, heavy rains or oppressive heat will decrease it, whereas the wind, even a very strong one, is quite ineffective. The birds sing mostly up in the air and occasionaly also when walking about on the ground. In this last case the song is softer, more subdued, and often interrupted by short intervals. A male often alights on an eminence of the ground to sing. By way of an experiment we stuck a short stick into the ground or placed a clod in a completely flat place, and a singing male perched on them readily.

The song delivered in mid air is started by the bird when it has reached a height of about 15 m; till that moment, when still soaring, it utters notes which consist only of „chrip“ and „chrup“. The song proper is composed of Corn Bunting- of Serin-like phrases, introduced by the note „viiéhh“ or more rarely „viihh“. The phrase itself sounds like „tziriléurylétzyrué“. Into its song the bird also weaves some notes of other birds living in the neighbourhood, but this practice varies from individual to individual in respect of its extent and skill shown by particular birds. Thus, we heard many characteristic themes of the Crested Lark, Skylark and Pratincole in their songs.

Some connections were also observed between the phases of the song and some elements of the nuptial flight. The bird ascends from the ground in two stages. In the first stage it flies steeply up by rapid beats of wings, then it hovers with its wings outstretched motionlessly and utters the main chirping phrase of the nuptial song. When flying upwards, the bird seldom moves in one direction, but it more frequently rises in a spiral. However, this ascent is not regular, the movement being rather swaying and interrupted by horizontal swerves. The vertical ascent and hovering at a spot, characteristic of the Skylark, was very rarely observed, and even then only for a short time.

The descent is completed by head-foremost dive-like vertical drop. Just above the ground, at a height of half a metre, the bird spreads its wings suddenly and alights after a slightly undulating, pipit-like, horizontal flight of 10—20 metres. More rarely it descends by stages, delivering the typical nuptial song and quite exceptionally the bird will descend obliquely.

The song-period lasts from the spring arrival till the end of the second breeding. The length of a song is closely connected with various activities of the bird, as shown in table I. Song is delivered all day, that is, from daybreak till nightfall except for hot midday hours. An interesting fact was observed, when we walked across a nesting area in the midday heat. Then the males rose one

after another in front of us and immediately broke into a strident song, which might be regarded as a protest against our intrusion. Hence, singing is not only a proclamation of occupation of the territory or one of the elements of courtship display, but also, at least in its intense variety, a means of defense of the territory, used against a man or any quadruped approaching on the ground as well as against the bird's conspecific rivals up in the air.

However, the protection of the territory is not confined to vocal protest. An intruder is usually attacked by the male in the air and chased as far as the border of the territory, the distance between the two birds being hardly a few centimetres. Sometimes, the rightful inhabitant of the territory attacks the intruder on the ground, compelling it to fly off and then pecking at it in the air until the intruder leaves the territory.

Table I

Time of uninterrupted singing of the Hungarian Short-toed Lark relative to its phenology and the stage of breeding

Date	Maximum duration of uninterrupted singing	Activity of bird
14 April	10—15 sec.	arrival
2—8 May	1—2.5 min.	selection of mate, nest-construction
27 May	6 min. 40 sec.	female incubates
6 June	1—2 min.	hatching
12 June	4—5 min.	second breeding, laying of eggs
21 June	26 min. (!)	female incubates
30 June	2—5 min.	hatching
17—18 July	0	no breeding

The Hungarian Short-toed Lark does not behave aggresively against some other species, e.g., the Kentish Plover, the Pratincole, the Skylark and the Wagtail, which are tolerated even in its close vicinity.

The area of the territories is more or less constant, and the nests are generally 40—50 m apart. Only once have we observed a distance of 15 m between two occupied nests. The density of nests is 4—5 nests per hectare, for both the first and the second breeding.

IV. COURTSHIP

During the period of courtship, males are extremely excited; their crown feathers are continually raised and lowered and the tail uplifted. When courtship becomes more vigorous, the male runs in small cricles round the female, spreading its tail and quivering the wings, which it keeps slightly apart from the body. From time to time the male rises and hovers 1—2 m above the female, at

times, again, it ascends as high as 25—30 m and, circling above the female, continues its song. At first, the female treats the descending male rather indifferently, sometimes even pecking at it. They are absorbed in the courtship ceremony so much that they can be observed at short quarters; once we even saw them fly onto the highway, which they otherwise never do. Copulation takes place on the ground, after rather a prolonged courtship display.

V. NEST BUILDING

Most nests are built in soda fields covered with wormwood and fescue *(Artemisiae-festucetum)*. In such places the Hungarian Short-toed Lark shows evident preference for sites where *Artemisia* prevails over *Festuca pseudovina*. It settles mainly in the sites of this type of vegetation, a few hundred square metres in area, more rarely in smaller and never in larger ones.

We have already mentioned that the nesting of the Hungarian Short-toed Lark exhibits some rudimentary elements of nesting in colonies. In addition, in a given nesting area with 10—20 pairs breeding together a majority of the nests are built practically simultaneously. Nest building generally takes seven to ten days, the weather conditions having no influence on constructing activities.

The Hungarian Short-toed Larks breed twice a year, and the nests of the first and the second breeding show considerable differences in situation. No regularity could be ascertained in the position of the nest of the first breeding in relation to the points of the compass. On the other hand, the nests of the second breeding are invariably situated so as to be shaded from the south, that is to say, they lay in hollows excavated on the north side of and just close to a tuft of fescue or wormwood or an eminence of ground. If one takes into consideration that the first breeding occurs in the second decade of May and the second breeding at mid-June, it becomes obvious that this habit has been acquired to protect the nest from the intense heat of solar radiation.

The nest depression of the Hungarian Short-toed Lark is a cylindrical hollow with a concave bottom or at most a semispherical hollow but its margin never overhangs it, whereas the nest depression of the Skylark narrows towards the opening and so its walls are concave (see Fig. 1). Where the bird fails to find any other material for nest lining, it uses exclusively grass for this purpose. Long culms and blades of fescue were applied for construction. We have observed cases in which the bird used grass leaves, 20—30 cm long, to build the nest. The nest cup, formed of long blades, is lined, in want of other materials, with finer pieces of grass, but, wherever possible, the bird uses still finer and softer materials for lining, e.g., poultry feathers (both covering feathers and down) and also the feathers of wild species, preferably those of the Lapwing, as well as sheep wool, pappus of thistles (*Carduus*, *Echinops*, etc.) and occasionally horsehair. Lining material is not brought from afar. This statement is supported

at full length by our observations made at Döghalom, south of Nagyiván. A nest, situated no more than 100 m from the only farm in the whole area, contained a large number of white feathers of ducks and geese, but the lining of another nest, about 250 m from the farm, had only one or two duck feathers as an addition to the abundant wool material, gathered in a nearby sheep-fold. Beyond the fold there were only wool-lined nests, and still farther the nest hollows were lined exclusively with grass.

Nest building consists in excavation of a hollow, construction of a grassy cup and its inner lining, but if a nest is situated in quite an open area, e.g., in the *Camphorosmaetum* community, the bird surrounds it with clods of alkali soil, which range from the size of a pea to that of a hazelnut, and eventually

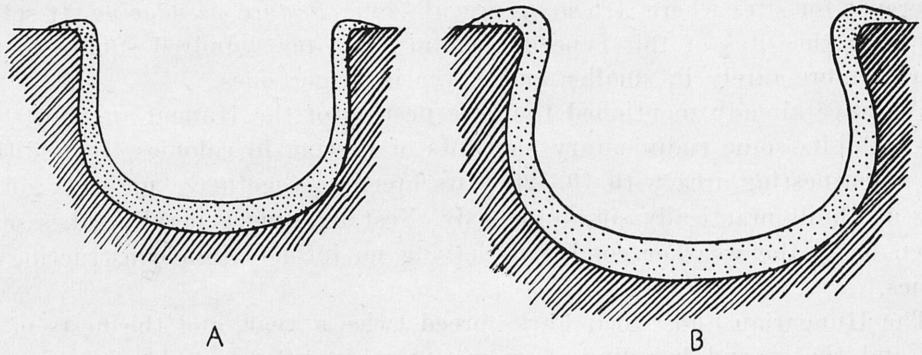


Fig. 1. A diagram of a vertical section of nest depressions with the nest of the Hungarian Short-toed Lark *Calandrella cinerea hungarica* (A) and that of the Skylark *Alauda arvensis*, showing the differences in shape between the nest depressions of these species.

with dry bits of animals droppings (see Phots. 1 and 2). We have found only one nest which represented an uncommon type of construction. It was situated on a barren, plantless, sheer alkali flat, where the bird was unable to dig a hollow in the soil dried to the hardness of stone and therefore it built a ring-like mound of soil clods lumped together to place its otherwise regular nest inside. The measurements of 30 nests were as follows: inner diameter — 55—80 mm, average 62·21 mm; inner depth — 30—60 mm, average 46·40 mm. Finally, it is also noteworthy that the number of nests which were abandoned before they had been finished is very large.

VI. EGGS

The first breeding, as has already been mentioned, begins in the second decade of May. According to our observations, weather has no visible influence on the time of incubation. The first egg is laid as early as the first day after the completion of nest bulding and the next eggs are laid one on each successive day. As in the case of the Red-footed Falcon, the Lesser Grey Shrike and the River

Warbler (Horváth, 1954, 1958, 1961), the size of the eggs of a clutch was found to be directly proportional to their place in the sequence of laying, that is, the first-laid egg is the smallest and the last one the largest.

The complete clutch consists usually of 5 eggs, rarely of 4. The smaller number probably occurs in pairs breeding for the first time. Our observations show that the clutches of the first and the second brood — this last takes place at mid-June — are the same size. Clutches of 3 eggs occur only in a case of supplementary laying. Bannerman (1953) reports, after Congreve, that the three-egg clutch is the rule in the western populations and the four-egg clutch in the eastern ones. As the northeasternmost member of Short-toed Larks, the Hungarian subspecies seems to lay the largest clutches.

When started, the incubating female as a rule runs away from the nest. It may occasionally be flushed only when incubation is well advanced, but not as a general habit; we have never observed the same female flush twice in succession. When the female leaves the nest, the male ceases singing and presently alights near it. Walking peacefully, one might even drive the birds on the ground. When the observer has walked a fairly long way past the nest, the male flies up again and either hovers above the nest or flies slowly away over it. Then, it ascends high up and restarts singing. By this time the female has run back to the nest, but it will not sit on it, until it feels quite safe. The female returns to the nest on the wing only when there are fledgelings in it, but even then very seldom.

After the hatching of fledgelings, addled eggs are either buried in the nest or removed from it, but no farther than 15—20 cm.

Eggs are rather spherical than ellipsoidal. The basic colour is pale yellowish or greenish-white. The pattern of spots is violet-grey and reddish-brown or yellowish-brown; the spots are generally minute and so densely disposed that the basic colour is hardly discernible. In rare cases the spots are large and then leave larger areas of the basic colour uncovered. Quite exceptionally the spots fuse into a wreath round the big end and otherwise cover the shell almost uniformly except for being denser at the big end. Occasionally, fine acicular sinuous black lines can be seen at the big end.

Measurements were taken on 30 eggs. The average size of egg is $19{\cdot}21 \times 14{\cdot}61$. Max.: $20{\cdot}8 \times 15{\cdot}3$ and $19{\cdot}55 \times 16{\cdot}15$. Min.: $18 \times 13{\cdot}9$ and $18{\cdot}9 \times 13{\cdot}55$ mm. Average weight of fresh egg: 2·21 g.

VII. INCUBATION

Incubation begins after the laying of the first egg and it is only the female that incubates. The incubation period proved to be invariably 13 days, which implies that weather conditions have no effect on the time of hatching. Nor did we observe any differences in this respect between the first and the second brood. If nests are visited without due care, the disturbed birds may abandon

the eggs, even though they have already been incubated. We found that a large number of eggs fall victims to the grazing sheep. It is interesting that Pratincoles and Kentish Plovers, which do not leave their nests, are left alone by the grazing sheep, whereas in the case of the Short-toed Lark, which runs off from the nest when approached, a sheep may step on the nest inadvertently.

VIII. FLEDGELING

After hatching the parent birds remove the egg-shells far from the nest; at any rate, we did not find any traces of them near the nests. The fledgelings move briskly soon after breaking out of the egg, they fling about, and defecate when touched, even though they have not yet been fed at all; in this case they excrete bloody mucus.

Twelve hours after hatching the ear-aperture of the fledgeling is naked and the eyes are closed. It does not open its bill to any stimuli. The bill is light horn in colour, short and conical, and its upper mandible is convex. The egg-tooth is porcelain white, the down white, slightly tinged yellow, and the bases of single feathers are greyish-white.

The twenty-four-hour-old fledgeling still has its eyes closed; nor does it open the bill yet. The skin on the upper side of the body, on the crown and lid is bluish-black, the neck is Bordeaux red, and the underside of the body is orange-red. The down on the head and on the back is 15 mm long.

The eyes of the thirty-six-hour fledgeling are still closed. It answers a soft, short and chirping note by opening its mouth perpendicularly, but it still does not respond to a touch. The oral mucous membrane is orange-red. There is an oval black spot on both sides of the posterior portion of the tongue and a triangular one in the anterior portion. At the end of the bill there is another triangular spot on both mandibles. The humerus and ulna are also downy.

When the fledgeling is sixty hours old, its eyes are still closed. It gapes immediately to a vocal stimulus. The egg-tooth is still present, about the size of a half pin-head. Having compared our observations made under different weather conditions and in various localities, we arrived at the conclusion that in optimal cases, when the insect fauna serving for food is abundant, the fledgelings develop rapidly, but in unfavorable rainy periods they retard in development and the weak individuals even starve. At this age the skin of the neck tends to being purplish-black and the crop is brownish. The down becomes darker and grey and some bluish-black feather sheaths appear on the wings.

The eyes of the eighty-four-hour fledgeling are not open yet. It gapes vigorously to a vocal stimulus. The skin on the underside of the body becomes darker, purplish-black, but there are no feathers present as yet.

The hundred-hour-old fledgeling begins to open its eyes. The egg-tooth is still present. One-millimetre-long feather sheaths can be seen on the wings. The fledgeling utters no voice as yet. It is a peculiar fact that after their eyes

open, the fledgelings settle in the nest so that they face in one and the same direction.

Parental care belongs mainly to the female; it is so even after hatching. Though both sexes share in feeding, it is always the female which shields the fledgelings from the hot solar radiation.

As early as the ninth or tenth day the young leave the nest. They are still quite unable to fly, but their legs are well developed and they can run very swiftly. Within a few days, that is, about the 11th—12th day, they can fly a distance of several metres, but only at a height of 10—20 cm. It is rather interesting that at this age they still have the bill and tongue spots as well as the egg-tooth. The young birds that begin flying are generally vociferous and chirp much. Taken in the hand, they become cataleptic and close their eyes.

When we approached the young out of the nest but still unable to fly, the male appeared immediately singing loudly and then alighted on the ground and ran about to draw us away from them. The female often participates in such a manoeuvre.

The male still perseveres in defending its territory, even when the young are able to fly, because the second brood is under way. As the second breeding follows the first directly, the young ones of the first brood are left alone and can be seen scattered all over the plain. Contrariwise, the young of the second brood stay in the charge of their parents and keep together for a long time. This is also suggested by the fact that the young of the first brood let people approach them much nearer (as near as 1—2 m) than those of the second brood.

As we have observed, every year a number of males continue singing nearly as late as the end of the second breeding and many a new nest depression, just commenced or under construction, can be found at that time. These depressions, however, are never finished, that is, it never comes to actual nesting and females do not appear in the territory.

The rarity of the Hungarian Short-toed Lark is due, among other things, to scanty offspring, which brings about a slight increase, if any, in the stock of birds. The loss of eggs and the mortality rate of nestlings are very high. While grazing, domestic animals trample a large number of nests; scores of them are flooded during heavy summer rains. The large number of addled eggs is due partly to this last occurrence and partly to the shyness of adult birds, which often leave eggs uncovered when alarmed by intruders. The conspicuous mortality of nestlings may also be ascribed to the impoverishment of the insect fauna during frequent and prolonged spells of drought. All the above-mentioned factors contribute to the maintenance of the stock of larks at nearly the same level, though the number of their natural enemies is very small.

IX. AUTUMNAL DEPARTURE

The greater part of the Hungarian Short-toed Larks leave Hortobágy towards the end of August. Before departure the whole stock of an area — 15—20 pairs of adult and young birds — move about in a flock in the common

nesting area. It is characteristic of this species that the birds do not venture too far and are not accompanied by members of other species. They spend these days feeding, resting, basking in the sunshine and preening their feathers. Unlike the Skylark, they always stay in sites with low vegetation. They are loath to fly and can be driven on the ground, unless one does it too vigorously; then they run particularly fast, and stop and start suddenly in a convulsive or jerky manner. Having taken to wing, they perform large undulated arches, then dive suddenly to the ground. When driven on the ground, they stop now and again, look back or turn sidewise and watch intently.

They keep stubbornly in the chosen area. As will be seen from our observations, neither areoplanes, which were then spraying insecticides, nor the construction of a highway in the neighbourhood made the birds abandon their nesting territories, though there were many identical sites in this region. In this species, nesting seems to be associated with grazing horses and sheep, whose droppings or manure with their rich insect fauna are of vital importance to these birds.

Hungarian Short-toed Larks leave the nesting area in a flock, almost all at the same time, though after their departure some solitary specimens may be seen in the flocks of Skylarks or Kentish Plovers. We failed to ascertain whether these were underdeveloped, weaker, younger or injured specimens lingering in this area, or some stray birds from other localities.

To sum up, we may state that the Hungarian Short-toed Lark is a bird of peculiar nature; it lives in restricted numbers, almost in colonies, in sharply defined nesting areas. There are several such nesting localities, 10, 20 and occasionally 30 km apart, and they are confined exclusively to the alkali flats of Hortobágy. In Hungary, and especially in the Great Plains between the Danube and the River Tisza, there is quite a number of alkali flats — there are also some south of Hortobágy — in which this bird has never nested and, what is more, it has never been seen there, even during migrations.

Its colonial and isolated occurrence in the northernmost localities of the geographic range of the species is a peculiar ornithological phenomenon. Unfortunately, its great attachment to the preferred nesting areas may sooner or later lead to the extinction of this species also in this region. For this reason we thought it urgent to study the habits and life history of this subspecies. This small lark is the only Hungarian endemic bird and this fact was another inducement to us, Hungarian ornithologists, to learn of its life as much as possible.

M. Endes
University of Medical Sciences, Debrecen
L. Horváth & B. Hüttler
Natural History Museum
Budapest, Baross utca 13

REFERENCES

Bannerman D. A. 1953. The Birds of the British Isles. London, **2**: 11—17.

Horváth L. 1954. The Life of the Red-legged Falcon *Falco vespertinus* in Ohat Forest, Hortobágy, Hungary. Acta XI Congr. Int. Ornith. Basel: 583—587.

Horváth L. 1956. A New Race of the Short-toed Lark in Hungary. Bull. Brit. Ornith. Club, London, **76**: 132.

Horváth L. 1958. The life of the Lesser Grey Shrike *Lanius minor* in the Great Plains between the Villages Alsónémedi and Ócsa, near Budapest, Hungary. Proc. XIIth Int. Ornith. Congr. Helsinki: 317—326.

Horváth L. 1962. The Life of the River Warbler *Locustella fluviatilis* at Ócsa, near Budapest, Hungary. Proc. XIIIth Int. Ornith Congr. Ithaca N. Y. U. S. A., **1**: 315—318.

Keve A. 1955. Madártani jegyzetek a Kunkápolnási pusztáról. Aquila, Budapest, **59—62**: 413—416.

Keve A. 1958. *Calandrella brachydactyla hungarica* Horváth. Fauna Hungariae, Budapest, **21**: 107.

Nagy J. 1934. A rövidujju pacsirta (*Calandrella brachydactyla* Leisl.) uj fèszkelómadár hazánkban. Aquila, Budapest, **38—41**: 153—157.

Nagy J. 1940. A hortobágyi sziki pacsirta. Hortobágyi Muzeum Kiadványai, Debrecen, **3**:24.

Sterbetz I. 1959. A hódmezövásárhelyi szikesek madárvilága. Aquila, Budapest, **65**: 189—208.

Szabó L. V. 1965. Fészkelo madártársulások vizsgálata a kunmadarasi szikeseken. Állatt. Közl., Budapest, **52**: 111—134.

Udvardy M. 1941. A Hortobágy madárvillága. Tisia, Debrecen, **5**: 92—169.

Udvardy M. 1960. Faunisztikai kiegésztások Hortobágy madárvilágához. Aquila, Budapest, **66**: 217—223.

Vönöczky-Schenk J. 1907. A sziki pacsirta eloforduldása a Hortobágyon. Aquila, Budapest, **14**: 223—275.

STRESZCZENIE

Węgierski skowrończyk rozwinął się jako północna, izolowana populacja tego gatunku, tworząc podgatunek przystosowany do równinnych, alkalicznych środowisk. Obserwacje, których wyniki obecnie opisujemy, prowadzone były w latach 1955, 1959, a następnie 1962—1965, obejmując tym samym 6 pełnych sezonów. Ptaki pojawiają się na Węgrzech w pierwszych dniach kwietnia. W miejscach lęgowych trzymają się razem i, jak się wydaje, poszczególne grupy lęgowe dobierają się już w czasie wędrówki, ponieważ, choć nie gnieżdżą się w typowych koloniach, to jednak 10 do 20 par przylatuje razem do miejsca zajmowanego przez wiele lat z rzędu. Miejsca wybierane do gnieżdżenia się są to płaskie tereny, należące do bardzo zdegradowanych środowisk alkalicznych. Porośnięte są głównie bylicą i kostrzewą, tworzącymi zespół *Artemisiae-festucetum*. Wśród tego występują bardziej sodowe połacie z zespołem *Camphorosmaetum*. W czasie wiosennego przylotu cały teren pokryty jest mniejszymi i większymi kałużami.

Śpiew jest nie tylko ogłoszeniem zajęcia terytorium lęgowego i jednym z elementów obyczajów godowych, ale także środkiem obrony terytorium nie

tylko przeciw człowiekowi lub czworonogom poruszającym się w okolicy po ziemi, lecz również przeciw rywalom z powietrza należącym do tego samego gatunku. Długość pieśni zależy od poszczególnych stadiów okresu lęgowego (por. tabela I). W wyborze miejsca na gniazdo skowrończyk węgierski przedkłada te miejsca, w których *Artemisia* przeważa nad *Festuca pseudovina*. Gniazda budowane są w tydzień do 10 dni. O ich charakterze i umiejscowieniu można przekonać się z fotografii (fot. 1—5) i schematycznego porównania z gniazdem skowronka polnego (ryc. 1). Pierwszy lęg przypada na drugą dekadę maja. Pełne zniesienie składa się z 5, rzadziej 4 jaj. Zniesienia pierwszego i drugiego lęgu — ten ostatni przypada w połowie czerwca — są jednakowej wielkości. Zniesienia, składające się z 3 jaj, zdarzają się tylko w przypadkach lęgów dodatkowych. Wysiaduje wyłącznie samica, przy czym rozpoczyna wysiadywanie od zniesienia pierwszego jaja. Okres wysiadywania trwa jednakowo 13 dni. Od chwili wylęgu opieka nad pisklętami jest głównie dziełem samicy. Choć bowiem oboje rodzice uczestniczą w karmieniu, jednak przed gorącymi promieniami słońca ocienia pisklęta tylko samica. Młode opuszczają gniazdo bardzo prędko: zwykle dziewiątego lub dziesiątego dnia. Są jeszcze wtedy całkowicie niezdolne do latania, ale nogi mają dobrze rozwinięte i mogą biegać bardzo szybko. W kilka dni później, jedenastego lub dwunastego dnia mogą już przelatywać kilka metrów, lecz tylko na wysokości 10 do 20 cm. Ciekawy jest fakt, że do tego okresu zachowują jeszcze plamki dziobowe i językowe oraz ząb jajowy. W związku z drugim lęgiem, następującym zaraz po pierwszym, pisklęta pochodzące z pierwszego są pozostawiane sobie i można je obserwować rozproszone po terenie, natomiast pisklęta z drugiego lęgu pozostają dłużej w rodzinnym stadzie.

Straty jaj i śmiertelność piskląt są bardzo wysokie. Pasące się zwierzęta domowe niszczą wiele gniazd, wiele też zatapiają silne letnie burze. Duża ilość niewylęgniętych jaj zależy częściowo od wspomnianych wyżej przypadków, a częściowo od wypłaszania dorosłych ptaków, które wtedy często porzucają jaja. Na dużą śmiertelność piskląt ma wpływ także zanikanie faun owadów, następujące w ślad za częstymi i długimi okresami suszy. Wszystkie te czynniki ograniczają w znacznym stopniu liczebność stada skowrończyków, mimo iż naturalnych wrogów jest bardzo mało. Większa część węgierskich skowrończyków opuszcza Hortobágy w końcu sierpnia.

РЕЗЮМЕ

Венгерский малый жаворонок был развит, как северная, изолированная популяция, образуя подвид, приспособленный к равнинным, щёлочным средам. Наблюдения, которых итоги здесь представленя, проведено в 1955, 1959, а затем в 1962—1965 гг., используя тем самым 6 полных сезонов. В Венгрии птицы появляются в первых днях апреля. В местах насиживания держатся вместе и, кажется, подбор отдельных гнездовых групп происходит уже во время перелёта. Они не

гнездатся в типичных колониях, однако к занимаемому участку прилетают вместе, в количестве 10—20 пар подряд через много лет. Выбираемые ими места гнездования это — плоские местности, принадлежащие к очень деградированным, щёлочным средам, поросшим, прежде всего, полынию и овсяницей, которые образуют ассоциации *Artemisiae-festucetum*. Среди неё выступают более щёлочные участки с ассоциацией *Camphorosmaetum*. Во время весеннего прилёта птиц вся территория покрыта малыми и большими лужами.

Пение является не только объявлением оккупирования гнездового участка и одним из элементов брачных игр, но также средством обороны этого участка перед человеком, животными пребывающими в этом районе, и перед соперниками в воздухе, принадлежащими в этому же виду. Продолжительность пения зависит от отдельных стадий периода насиживания (ср. табл. I). В выборе места на гнездо венгерский малый жаворонок чаще выбирает те места, в которых превалирует *Artemisia* над *Festuca pseudovina*. Строение гнезда происходит в течении 7—10дней. Об его характере и локализации можно убедиться из фотографии (фот. 1—5) и схематического сравнения с гнездом полевого жаворонка (фиг. 1). Первая кладка имеет место во второй декаде мая. Полная кладка состоит из 5, реже 4 яиц. Кладки первого и второго насиживания (второе происходит в половине июня) одинаковы. Кладки состоящие из 3 яиц случаются при условии добавочного насиживания. В насиживании участвует исключительно самка сразу после кладки первого яйца. Время насиживания длится 13 дней. С момента вылупления, забота над птенцами принадлежит прежде всего самке. Хотя самец принимает участие в кормлении птенцов, однако только лишь самка способна заслонять их перед палящими лучами солнца. Птенцы покидают гнездо очень рано: обычно на девятый или десятый день. Тогда они ещё не могут летать, но зато имеют хорошо развитые ноги способные к быстрому бегу. Немного позже, на одиннадцатый или двенадцатый день, они могут уже пролетать на высоте 10—20 см, несколько метров. Интерес представляет то, что к этому времени они сохраняют ещё клювовые и язычные пятна и яйцевой зуб. В связи с тем, что после первого наступает сразу насиживание, первые выводки остаются без заботы родителей и можно их наблюдать разбросанными по местности. Наоборот-вторые выводки остаются дольше в росной стае.

Потери яиц и смертность птенцов очень высокие. Пасущиеся домашние животные уничтожают много яиц вместе с гнёздами. Большое количество их затопляют летние дожди. Много не ылупившихся яиц остаётся из-за уплмянутых выше причин, а также частично из-за выпугивания взрослых птиц, которые после этого оставляют яйца. Исчезновение фаун насекомых имеет также влияние на большую смертность птенцов. Это часто наступает после частых и длинных периодов засухи. Все эти факторы в значительной степени ограничивают численность стаи венгерских малых жаворонков, хотя естественных врагов имеется очень немного. Большинство венгерских малых жаворонков покидает Хортобадь в оцнце августа.

Plate XXIV

Phot. 1. A greatly dried open area with the nest of a Hungarian Short-toed Lark.
Phot. 2. The same nest at a short distance. A ring mound of clods of alkali soil can be seen round the nest.



1

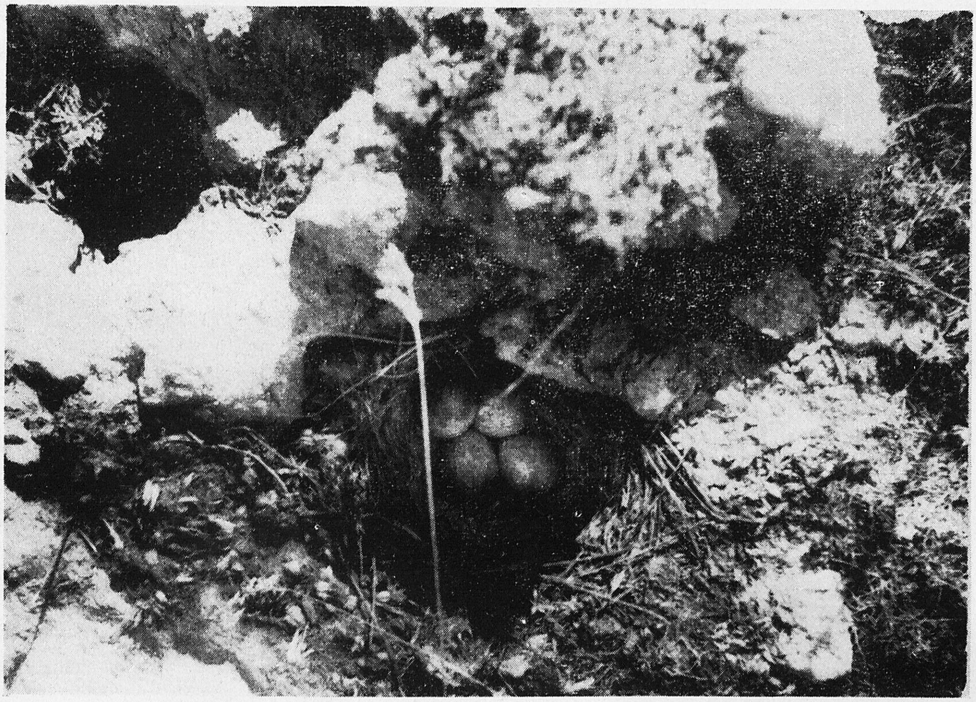


2

M. Endes, L. Horváth, B. Hüttler

Plate XXV

Phot. 3. A nest of the Hungarian Short-toed Lark shielded by an eminence of the ground
Phot. 4. Five-day-old fledgelings of the Hungarian Short-toed Lark in the nest.



3



4

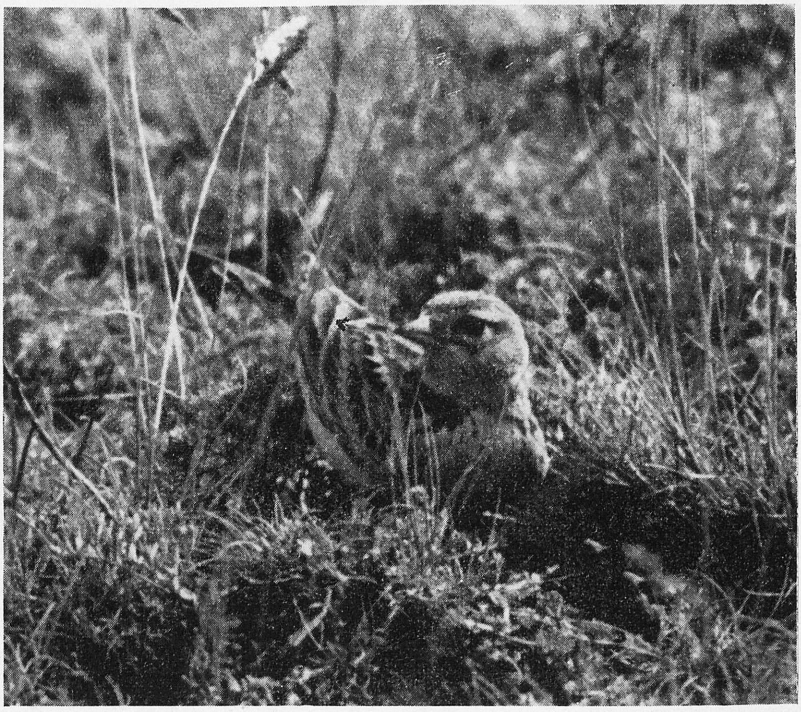
M. Endes, L. Horváth, B. Hüttler

Plate XXVI

Phot. 5. A female of the Hungarian Short-toed Lark feeding the young in the nest.
Phot. 6. An adult bird brooding the young in the nest.



5



6

M. Endes, L. Horváth, B. Hüttler

Redaktor zeszytu: dr Z. Bocheński

PAŃSTWOWE WYDAWNICTWO NAUKOWE—ODDZIAŁ W KRAKOWIE—1967

Nakład 700+90 — Ark. wyd. 1,25 — Ark. druk. 1 4/16 — Papier druk. sat. kl. III 80 g 70×100
Zam. 348/67 Cena zł 10,—

DRUKARNIA UNIWERSYTETU JAGIELLOŃSKIEGO W KRAKOWIE